

PORTING A DIRECTORY NUMBER FOR A DURATION OF TIME

TECHNICAL FIELD

The invention relates generally to telecommunications and more particularly to porting directory numbers associated with telephony
5 devices.

BACKGROUND

Number portability ("NP") is a telecommunications network feature that enables a user of a telephony device to retain their directory number when changing service providers, service types, and/or locations. For
10 example, the user may desire to temporarily try out a new telephony device and/or a new set of services while retaining their directory number. So, to port the directory from a first service provider to a second service provider, databases associated with the first and second service providers in one example are manually updated.

15 Before porting the directory number, the user receives service from the first service provider. Upon porting the directory number to the second service provider, the user receives service from the second service provider. To port the directory number between the service providers, one or more employees of the second service provider manually enter an
20 association between the directory number and a location routing number into a database associated with the second service provider. The employees of the second service provider may also request that the first

service provider manually updates a database associated with the first service provider.

After porting the number from the first service provider to the second service provider, the user may desire to restart service with the first service provider. So, the directory number must be ported back from the second service provider to the first service provider and the databases associated with the first and second service providers must be manually updated a second time. Manual updating of the databases may take several days. As one shortcoming, the user of the telephony device associated with the directory number may not receive service from either of the service providers until both the databases are updated. It is desirable for the user of the telephony device associated with the directory number to receive continuous service.

Thus, a need exists to reduce an amount of time required to port a directory number between service providers. A further need exists to reduce a duration of a potential service interruption experienced by a user while porting the directory number.

SUMMARY

The invention in one implementation encompasses an apparatus. The apparatus comprises a portability component that automatically updates one or more provisioning components to port a directory number for a duration of time.

Another embodiment of the invention encompasses a method. One or more provisioning components are automatically updated to port a directory number for a duration of time.

Yet another embodiment of the invention encompasses an article.

- 5 The article comprises one or more computer-readable signal-bearing media. The article comprises means in the one or more media for automatically updating one or more provisioning components to port a directory number for a duration of time.

DESCRIPTION OF THE DRAWINGS

- 10 Features of exemplary implementations of the invention will become apparent from the description, the claims, and the accompanying drawings in which:

- FIG. 1 is a representation of one exemplary implementation of an apparatus that comprises one or more portability components, one or
15 more management components, and one or more networks.

- FIG. 2 is a representation of one or more components of the networks of the apparatus of FIG. 1. The networks comprise one or more local portability databases, one or more timer components, one or more subscriber databases, one or more switch components, and one or more
20 provisioning components.

FIG. 3 is a representation of an exemplary process flow of a request to port a directory number for a duration of time received by the

portability component from a provisioning component of the apparatus of FIG. 2.

FIG. 4 is a representation of an exemplary process flow of a request to make permanent a ported directory number received by the portability
5 component from a provisioning component of the apparatus of FIG. 2.

FIG. 5 is a representation of an exemplary process flow of resetting a value of a duration of time to port a directory number by the portability component of the apparatus of FIG. 1.

DETAILED DESCRIPTION

10 Turning to FIGS. 1-2, an apparatus 100 in one example comprises one or more portability components 105, one or more management components 110, and one or more networks 115 and 120. The networks 115 and 120 in one example comprise one or more telephony networks that are owned and/or operated by one or more service providers. The
15 management component 110 in one example comprises a Number Portability Administration Center Service Management System ("NPAC"), as will be understood by those skilled in the art. The portability component 105 and the management component 110 communicate through employment of one or more protocols, for example, a Session
20 Initiation Protocol ("SIP") or a Simple Network Management Protocol ("SNMP"). The portability component 105 and the networks 115 and 120 communicate through employment of one or more protocols, for example,

SIP, an Internet Standard-41 ("IS-41"), and an Advanced Intelligence Network ("AIN").

The portability component 105 in one example provides information to port a directory number to the management component 110. The
5 management component 110 in one example updates one or more local portability databases 205 and 210 associated with the networks 115 and 120. The portability component 105 provides information to one or more network components associated with the networks 115 and 120 to port the directory number. The networks 115 and 120 employ the information
10 to provide and/or to terminate service for one or more telephony devices, for example, one or more wired telephones, wireless telephones, and/or personal computers, associated with the directory number.

The networks 115 and/or 120 in one example comprise the one or more local portability databases 205 and 210, one or more timer
15 components 215 and 220, one or more subscriber databases 225 and 230, one or more switch components 235 and 240, and one or more provisioning components 245 and 250. In one example, the subscriber databases 225 and/or 230 comprise one or more home location registers, as will be understood by those skilled in the art. The subscriber
20 databases 225 and/or 230 comprise one or more subscriber databases located within the switch components 235 and/or 240. The switch components 235 and/or 240 in one example comprise one or more telephony switches. The subscriber databases 225 and/or 230 and the

switch components 235 and/or 240 in one example cooperate to provide and/or to terminate service to the telephony devices.

The provisioning components 245 and 250 in one example comprise one or more customer care centers associated with the networks 115 and 120, respectively. In one example, the provisioning components 245 and/or 250 initiate one or more requests to port a directory number for a duration of time to the portability component 105. In another example, the provisioning components 245 and/or 250 receive from the portability component 105 one or more updates for one or more directory numbers ported to the network 115. The updates in one example comprise the directory number or a location routing number ("LRN") and a value for the duration of time to port the directory number. Upon receipt of an update for a directory number, the provisioning components 245 and/or 250 notify the subscriber databases 225 and/or 230, respectively, of the directory number to port for the duration of time.

The local portability databases 205 and/or 210 in one example comprise one or more entries for one or more directory numbers that have been ported to/from the networks 115 and/or 120. The entries in one example comprises a directory number and a location routing number for a telephony device that is ported from the network 115 to the network 120, as will be understood by those skilled in the art. The timer components 215 and/or 220 in one example comprise one or more timers associated with one or more directory numbers associated with the telephony devices. In one example, the timer components 215 and/or

220 are resident in the subscriber databases 225 and/or 230, respectively. In another example, the timer components 215 and/or 220 are resident in the provisioning components 245 and/or 250. In yet another example, the timer components 215 and/or 220 are resident in the local number portability databases 205 and/or 210.

The portability component 105 in one example receives one or more requests to port a directory number for a duration of time from the provisioning components 245 and/or 250. A request to port a directory number in one example comprises an association between a ported-from number (directory number or location routing number) and a ported-to number (location routing number), one or more identifiers associated with one or more network components, and a value for the duration of time. In one example, a request to port a directory number comprises an association between the directory number and a location routing number. In another example, a request to port a directory number comprises an association between a first (old) location routing number and a second (new) location routing number. For example, if a directory number is ported more than one time, the request comprises an association between a first location routing number and a second location routing number. The identifiers associated with the one or more network components in one example comprise the provisioning components 245 and/or 250, and/or the subscriber databases 225 and/or 230. In one example, a first identifier is associated with a ported-from provisioning component, for example, the provisioning component 245, and a second identifier is

associated with a ported-to provisioning component, for example, the provisioning component 250. The portability component 105 employs the identifiers to automatically update the one or more network components (e.g., the provisioning components 245 and/or 250 and/or the subscriber
5 databases 225 and/or 230) upon receipt of the request. The value for the duration of time in one example indicates one or more of: a period of time, a date in the future, or a permanent status.

The portability component 105 in one example stores the association between the ported-from number (the directory number or
10 the (old) location routing number) and the ported-to number (location routing number), the one or more identifiers, and the value for the duration of time. The portability component 105 employs the association to update the network components associated with the identifiers. In one example, upon receipt of a request to update a duration of time for a
15 directory number, the portability component 105 employs the association to reset a value of the duration of time within the timer components 215 and 220. In another example, upon receipt of a request to make permanent the port of the directory number, the portability component 105 updates the network components associated with the one or more
20 identifiers of the association.

Upon receipt of a request from the provisioning component 250, the portability component 105 employs one or more of the one or more identifiers to automatically update the provisioning component 245 of the request to port the directory number for the duration of time. In one

example, the portability component 105 provides a value for the duration of time to the provisioning component 245. In another example, the portability component 105 provides an association between a ported-from telephony number (e.g., the directory number) and a ported-to telephony number (e.g., the location routing number) to the provisioning component 245. The provisioning component 250 in one example updates the subscriber database 230 upon receipt of the association. The portability component 105 automatically updates the management component 110 upon receipt of the request from the provisioning component 250.

The portability component 105 cooperates with the provisioning components 245 and 250 to port the directory number back to an initial state from a ported state upon an expiration of the duration of time. The initial state in one example comprises a service provider and/or a set of services provided to a telephony device associated with the ported-from number before the request to port the directory number. The ported state in one example comprises a service provider and/or a set of services provided to the telephony device associated with the ported-to number. Upon the expiration of the duration of time, the portability component 105 initiates one or more notifications of the expiration of the duration of time to the management component 110 and/or the provisioning components 245 and 250. In one example, the portability component 105 initiates a notification to the management component 110 to remove the port of the directory number to the location routing number. In another example, the portability component 105 initiates a notification to

the management component 110 to alter the port of the directory number to port the directory number back to the ported-from telephony number. The portability component 105 initiates a notification to the provisioning components 245 and 250 to remove and/or alter the association.

5 The timer components 215 and/or 220 receive and store one or more values for one or more durations of time for one or more directory numbers. The timer components 215 and/or 220 employ a value of a duration of time to determine an expiration of the duration of time. In one example, the timer component 215 sends a notification of the
10 expiration of the duration of time for a directory number to the portability component 105. In another example, the timer component 220 sends a notification of the expiration of the duration of time to the subscriber database 230.

 The subscriber databases 225 and 230 and the switch components
15 235 and 240 in one example cooperate to provide and/or to withhold service for one or more telephony devices associated with the networks 115 and 120. The subscriber databases 225 and/or 230 in one example comprise one or more subscriber entries associated with one or more directory numbers. The subscriber entries in one example comprise one
20 or more ported-out flags. The ported-out flags indicate a status of a directory number. If a ported-out flag is set, the directory number is ported from a network and/or a set of services. If the ported-out flag is not set (i.e., the ported-out flag is cleared), the directory number is not ported from the network and/or the set of services. For example, where

the ported-out flag is set in a subscriber entry for a directory number in the subscriber database 225, the subscriber database 225 and the switch component 235 cooperate to withhold providing service to the directory number. In one example, the subscriber database 225 clears the ported-out flag associated with the directory number upon receipt of a
5 notification of an expiration of the duration of time from the provisioning component 245.

The subscriber databases 225 and 230 and the switch components 235 and 240 in one example cooperate to provide one or more messages
10 to a user of a telephony device associated with a directory number. In one example, the subscriber database 225 and the switch component 235 cooperate to provide a "failure to pay", or deadbeat, message to one or more callers to the directory number upon receipt of an expiration of the duration of time. In another example, the subscriber database 225 and
15 the switch component 235 cooperate to provide a message to the user of the telephony device associated with the directory number indicating a period of time remaining until the expiration of the duration of time to port the directory number.

An illustrative description of exemplary operation of the apparatus
20 100 is presented, for explanatory purposes.

Turning to FIG. 3, the provisioning component 245 requests to port a directory number from the network 115 to the network 120. In STEP 305, the provisioning component 245 initiates a request to port the directory number to the portability component 105. The request

comprises a ported-from number as the directory number, a ported-to number as a location routing number, an identifier associated with the timer component 215, an identifier associated with the provisioning component 250, an identifier associated with the provisioning component 245, and a value for a duration of time of five days. In STEP 310, the portability component 105 employs the identifier associated with the provisioning component 250 to update the provisioning component 250. In STEP 315, the portability component 105 employs the identifier associated with the timer component 215 to provide the value for the duration of time of five days to the timer component 215. In STEP 320, the portability component 105 updates the management component 110 with the identifiers. In STEP 325, the management component 110 provides the association between the directory number and the location routing number to the local portability database 205. In STEP 330, the management component 110 provides the association between the directory number and the location routing number to the local portability database 210. The local portability database 210 stores the association between the directory number and the location routing number.

In STEP 335, the timer component 215 sends a notification of an expiration of the duration of time associated with the directory number to the portability component 105. In STEP 340, the portability component 105 notifies the management component 110 of the expiration of the duration of time. In STEP 345, the management component 110 notifies the local portability database 205 upon the expiration of the duration of

time. The management component 110 removes the association between the directory number and the location routing number. In STEP 350, the management component 110 notifies the local portability database 210 to remove the association between the directory number and the location
5 routing number. The local portability database 210 removes the entry.

In STEP 355, upon receipt of the notification of the expiration of the duration of time, the portability component 105 employs the identifier associated with the provisioning component 245 to update the provisioning component 245 to port the directory number back to an
10 initial state. In STEP 360, the portability component 105 employs the identifier associated with the provisioning component 250 to update the provisioning component 250 to terminate service for the telephony device.

Turning to FIG. 4, the portability component 105 updates one or
15 more network components to make permanent a port of a directory number from the network 115 to the network 120. In STEP 405, the provisioning component 245 initiates a request to the portability component 105 to make permanent the port of the directory number. The portability component 105 removes the association of the directory
20 number. In STEP 410, the portability component 105 employs an identifier associated with the timer component 215 to update the timer component 215. The timer component 215 removes the value for the duration of time to port the directory number.

In STEP 415, the portability component 105 employs an identifier associated with the provisioning component 250 to update the provisioning component 250 to make permanent the port for the directory number. In STEP 420, the portability component 105 employs an
5 identifier associated with the provisioning component 245 to update the provisioning component 245 to make permanent the port for the directory number. In STEPS 425 and 430, the provisioning components 245 and 250 update the subscriber databases 225 and 230 respectively. The directory number is permanently ported from the network 115 to the
10 network 120.

Turning to FIG. 5, the portability component 105 receives a request to reset a value for a duration of time to port a directory number. In STEP 505, the provisioning component 245 sends the request to the portability component 105 to provide a second value for the duration of
15 time to port the directory number from the network 115 to the network 120. In STEP 510, the portability component 105 communicates with the timer component 215 to provide the second value for the duration of time through employment of an identifier associated with the timer component 215. The timer component 215 updates a timer associated with the
20 directory number with the second value.

The apparatus 100 in one example comprises a plurality of components such as computer software and/or hardware components. A number of such components can be combined or divided in the apparatus 100. An exemplary component of the apparatus 100 employs and/or

comprises a set and/or series of computer instructions written in or implemented with any of a number of programming languages, as will be appreciated by those skilled in the art.

The apparatus 100 in one example employs at least one
5 computer-readable signal-bearing medium. One example of a computer-readable signal-bearing medium for the apparatus 100 comprises an instance of a recordable data storage medium such as one or more of a magnetic, electrical, optical, biological, and atomic data storage medium. The recordable data storage medium in one example comprises the
10 storage devices 203, 206, 207, 208, 209, 211, and 212. In another example, a computer-readable signal-bearing medium for the apparatus 100 comprises a modulated carrier signal transmitted over a network comprising or coupled with the apparatus 100, for instance, one or more of a telephone network, a local area network ("LAN"), the Internet, and a
15 wireless network. An exemplary component of the apparatus 100 employs and/or comprises a set and/or series of computer instructions written in or implemented with any of a number of programming languages, as will be appreciated by those skilled in the art.

The steps or operations described herein are just exemplary. There
20 may be many variations to these steps or operations without departing from the spirit of the invention. For instance, the steps may be performed in a differing order, or steps may be added, deleted, or modified.

Although exemplary implementations of the invention have been depicted and described in detail herein, it will be apparent to those skilled in the relevant art that various modifications, additions, substitutions, and the like can be made without departing from the spirit of the invention
5 and these are therefore considered to be within the scope of the invention as defined in the following claims.